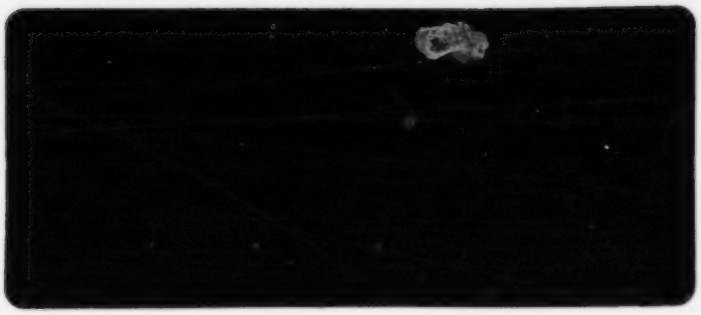
Northwest Territories Environment and Natural Resources



BARREN-GROUND CARIBOU DISTRIBUTION IN LATE WINTER 2004, CENTRAL NWT

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ABSTRACT

The area from Great Slave Lake to the Mackenzie delta and east to the Coronation Gulf area of Nunavut is the wintering range for several barren-ground caribou herds including the Cape Bathurst, Bluenose-West, Bluenose-East and Bathurst herds. Between February and April 2004 we surveyed this area in order to map the distribution of wintering caribou, as some communities had reported the absence of caribou from some of their typical wintering areas. We used fixed winged aircraft flown along predetermined transect lines to map the caribou distribution in survey areas. We found that caribou were widely distributed across the western NWT in late winter 2004 and that the highest concentration of caribou was found southwest of Great Bear Lake. Lower numbers of caribou were on the arctic coast northeast of Tuktoyaktuk and a band of caribou was spotted extending southeast from Inuvik to northeast of Colville Lake. There were also caribou along the east side of Great Bear Lake to east of the Coppermine River. The Bluenose-West herd normally winters from the southern Tuktoyaktuk Peninsula and Husky Lakes area to Paulatuk and south to Great Bear Lake. However, in winter 2003-2004, most caribou appeared to winter in the area of Great Bear Lake, possibly in response to freezing rain along the coast and deeper snow than usual in the Inuvik Region. As expected, there was also some overlap found between the herds in the use of winter ranges.

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INTRODUCTION

In late winter 2004 hunters from Colville Lake, Fort Good Hope, Norman Wells, and Paulatuk reported an absence of barren-ground caribou *Rangifer tarandus groenlandicus* near their communities. In response to community concerns we planned aerial surveys based out of Inuvik and Norman Wells to map the distribution of caribou from the Bluenose-East, the Bluenose-West and the Cape Bathurst herds.

Community knowledge provides considerable information on caribou winter distribution. However, this information is not readily available until it is compiled into a more accessible source such as maps. In addition to the unavailability of caribou distribution information, the Great Bear Lake area was last covered during previous winter aerial surveys between 1949 and 1960, and 1966 and 1981 (Carruthers and Jakimchuk, 1981).

Herd size and the condition of wintering range affect annual caribou winter ranges. A map was needed to understand how the caribou had shifted their distribution. As a basis for comparison of areas used in recent winters, we had information on caribou distribution based on satellite collars (Figure 1) (Nagy *et al.*, in prep.; Gunn *et al.*, 2001). The ability to identify the movements of known individual caribou allowed us to describe the overlap between herds in their use of winter ranges (Nagy *et al.*, in prep.; Gunn and D'Hont, 2003).

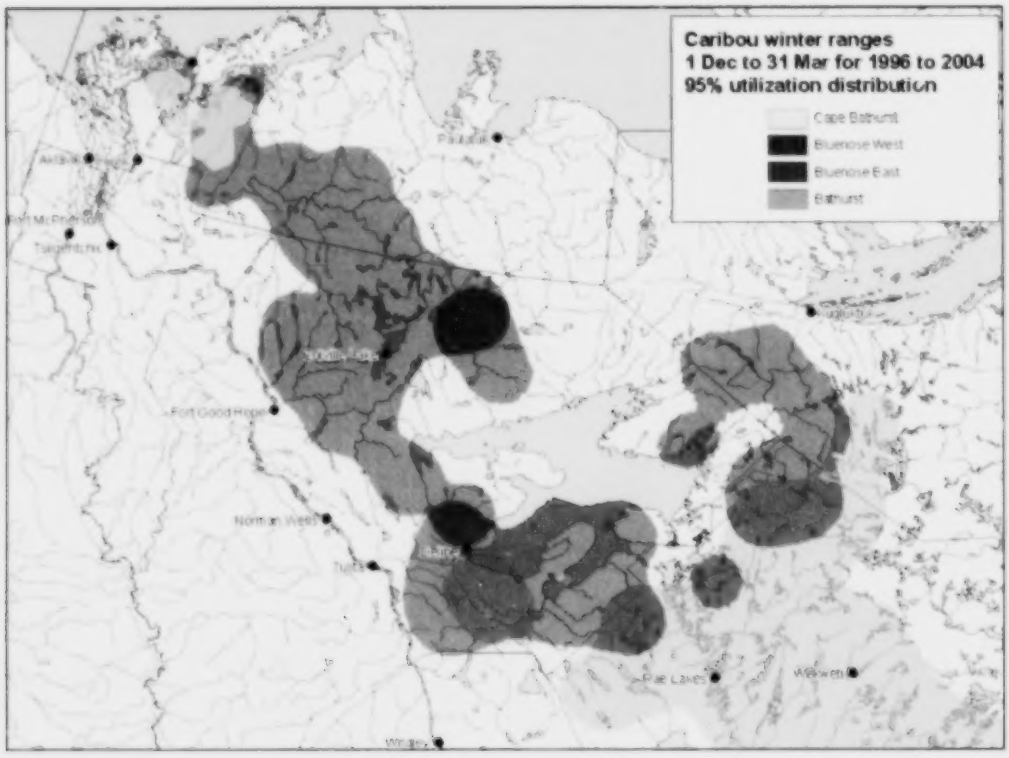

Figure 1. Overlap in winter ranges for the barren-ground caribou herds, NWT, based on satellite-telemetry of cows, 1996–2004.

The number of collared cows was low. In March 2004 we had seven cows fitted with satellite-collars from the Bathurst herd and three cows fitted from the Bluenose-East herd. One satellite-collared cow from the Bluenose-East herd was wintering east of the Coppermine River, and the other two collared cows were south of Great Bear Lake and west of Gameti. Five of the Bathurst collared cows were east of Gameti and two were southeast of Lutsel K'e. For the Bluenose-West and Cape Bathurst herds, we had two and four satellite collars, respectively.

We planned late winter aerial surveys to map the caribou distribution to include and extend beyond the locations of the satellite-collared cows. We maximized the

extent of the geographic area covered by increasing the distances between the transect lines (thus reducing coverage). The survey was planned to map relative distribution rather than estimate caribou numbers.

This report describes two initial late winter (March) aerial surveys on the winter ranges of the Cape Bathurst, Bluenose-West, and Bluenose-East herds. The first survey took place southwest of Great Bear Lake and revealed relatively large numbers of caribou close to Deline. The second survey was an attempt at radio telemetry in search of 2001 vhf collars. This survey would identify if the caribou southwest of Deline were Bluenose-East or Bluenose-West herds. Results of the one-day radio-tracking flight are included in this report. We also added a third aerial survey flown in April to extend the area northeast of Great Bear Lake, where Inuit from Kugluktuk were hunting caribou, and where there was a Bluenose-East satellite-collared cow.

METHODS

Using Inuvik as a base in March 2004, we (JN) flew in a Cessna 185 at approximately 150 m above ground, with an air speed of approximately 160 km/h. We counted caribou within a 0.5-km strip on either side of the aircraft along transects spaced at 20 km. We left the transect to count any animals seen off-transect. We stored all wildlife sightings and tracks as waypoints and the aircraft's track was recorded by the Global Positioning System in the survey aircraft. Prior to flying the survey, information from hunters and pilots on the distribution of caribou was used to guide the application of survey coverage by avoiding areas known to have no caribou.

We (RP) flew out of Norman Wells in March 2004 and used a Helio-Courier aircraft flown at 150 m above ground (agl) at an air speed of approximately 160 km/h. The radio-tracking flight was in a Cessna 206 flown at 3,000 m agl. Most of the known winter range of barren-ground caribou in the Sahtu Settlement Area (SSA) was surveyed. As with the Inuvik surveys, local information aided decisions on which areas to fly. Line transect spacing was 20 km below tree line and 30 km northeast of Great Bear Lake.

In areas with few lakes, areas below the tree line and during low light conditions concentrations of localized caribou were probably missed. This was particularly the case between Aubrey Lake, Tedji Lake and Simpson Lake. Above tree line survey coverage at 30 km spacing was good. All caribou observed at any distance were included.

The April 2004 survey was in a Cessna 337 based at Norman Wells and Kugluktuk. We (RP) flew at approximately 150 m to 600 m agl at approximately 160 km/h. The selection of survey area was based on local knowledge of caribou distribution from hunters, and also to cover the area not covered by the March surveys. We flew each transect until about 10 km beyond the last caribou or caribou track sightings.

RESULTS

On the flights east and southeast of Inuvik (Figures 2 and 3), between 24 and 28 March 2004, we counted a total of 634 caribou on transect and an additional 387 off transect. We also counted 16 moose *Alces alces* and 50 muskoxen *Ovibos moschatus* (Figure 4). The distance flown was 5600 km. Weather conditions at the time of the survey were clear and sunny with excellent visibility over 100% snow cover. Temperatures were in the low to mid -30 °Cs during most of the survey. The inadequate heater in the aircraft meant that we had to frequently scrape ice off the window, resulting in reduced visibility.

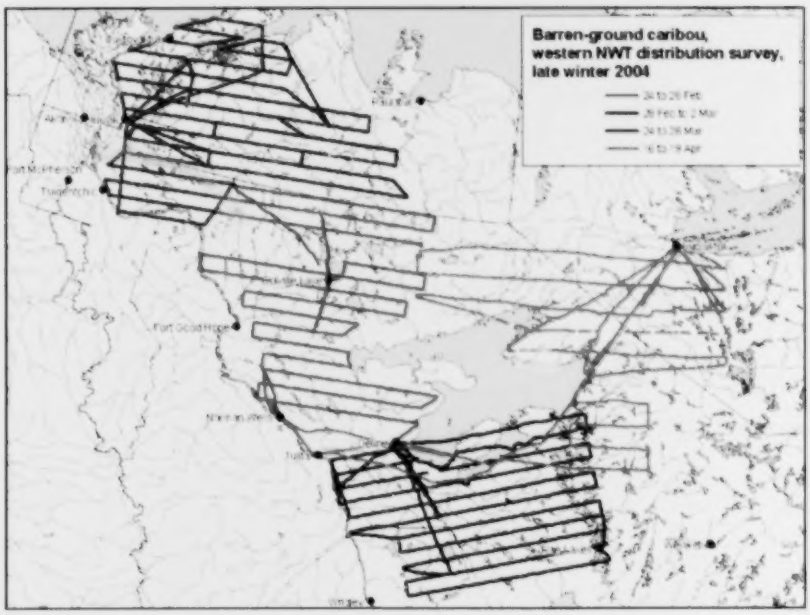

Figure 2. Flight lines flown in February, March and April 2004, NWT.

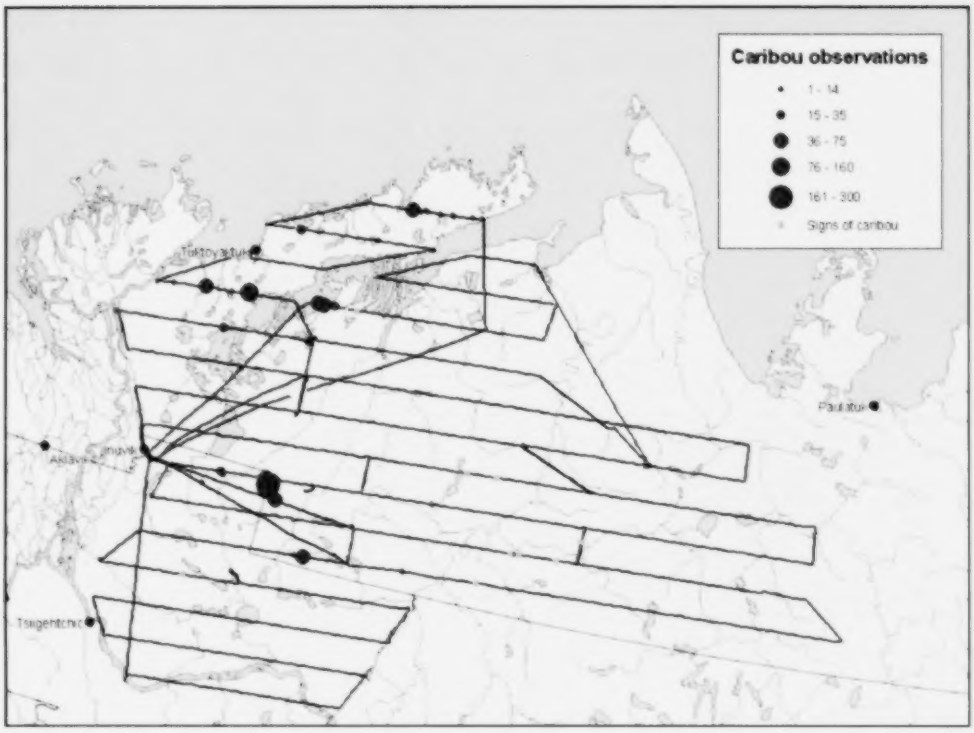

Figure 3. Caribou and signs observed on and off transect, 24 to 28 March, 2004 east of Inuvik, NWT.

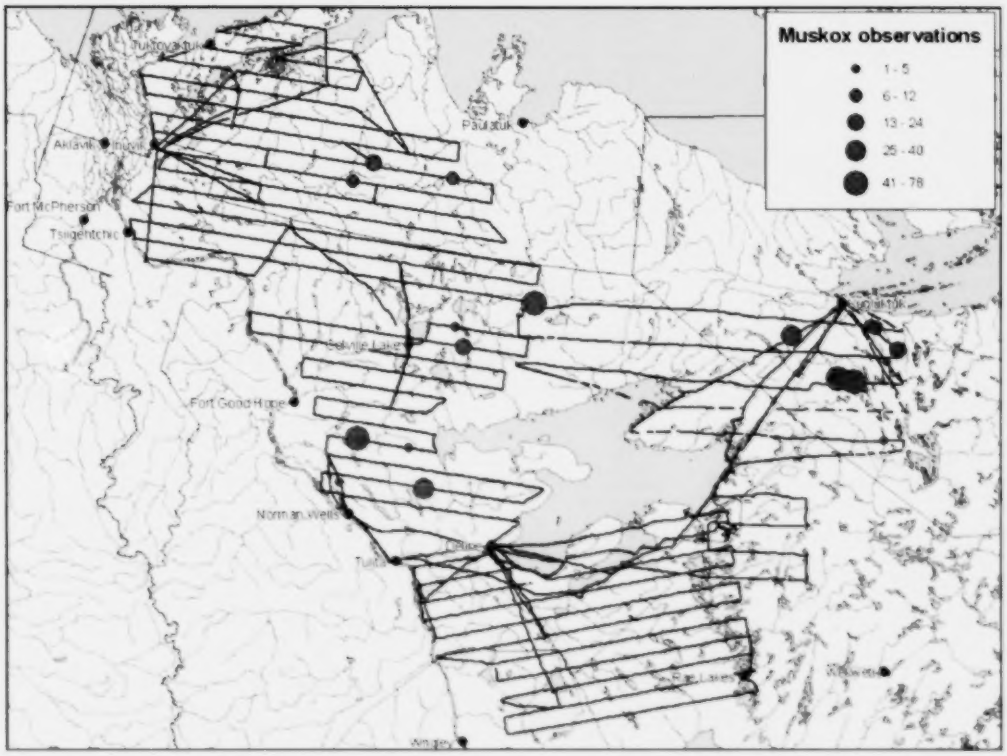

Figure 4. Muskoxen observed along transects flown February to April, 2004.

In Sahtu Settlement Area, the area northwest of Great Bear Lake was flown 24 to 28 February (Figures 2 and 5). We counted 1,694 barren-ground caribou on the transects. We also counted 17 boreal woodland caribou *Rangifer tarandus caribou* (Figure 6), 149 moose, 177 muskoxen (Figure 4), 15 wolves *Canis lupus*, and 2 foxes. The distance flown was 4,600 km. Visibility was excellent, with clear weather conditions and temperatures in the -30 °Cs. Some flat light conditions occurred during occasional periods of light snow on 24 and 25 February. The gap in flight lines north of Colville Lake were the result of a GPS track recording problem, though the transects were flown and observations recorded (Figure 2).

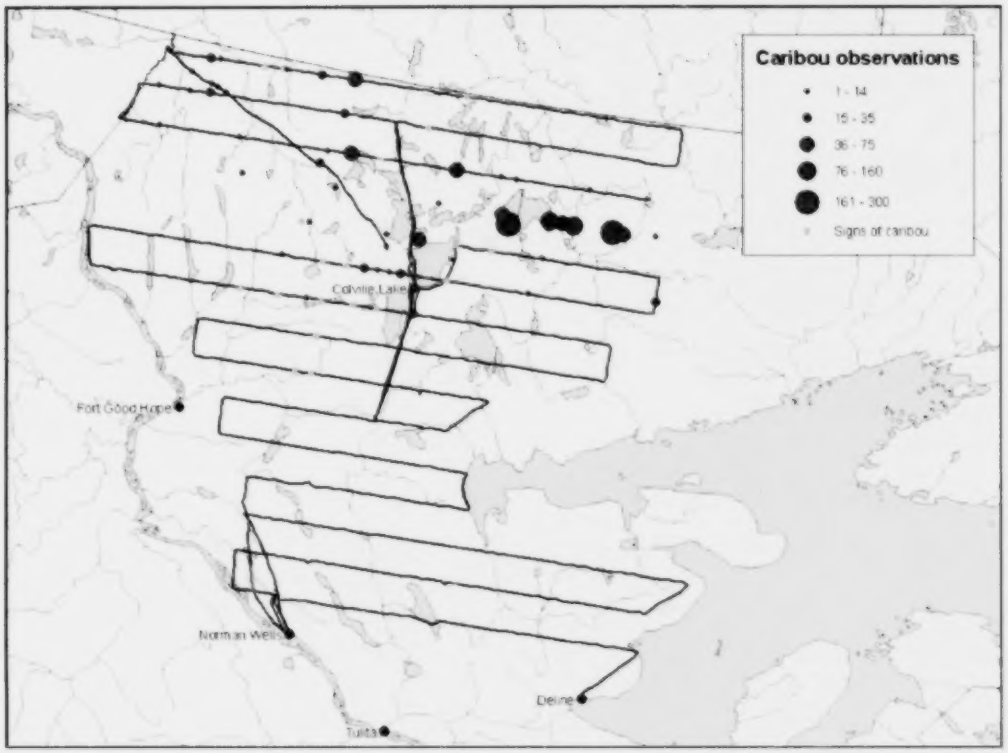

Figure 5. Caribou and signs observed along transect 24 to 28 February, 2004 northwest of Great Bear Lake, NWT.

On flights southwest of Great Bear Lake on 28 February to 2 March (Figures 2 and 7) we counted a total of 9,895 barren-ground caribou. Other species observed were 24 boreal woodland caribou (Figure 6), 78 moose and 4 wolves. The distance flown was 4,700 km. Weather was -30 °C with clear conditions, giving excellent visibility.

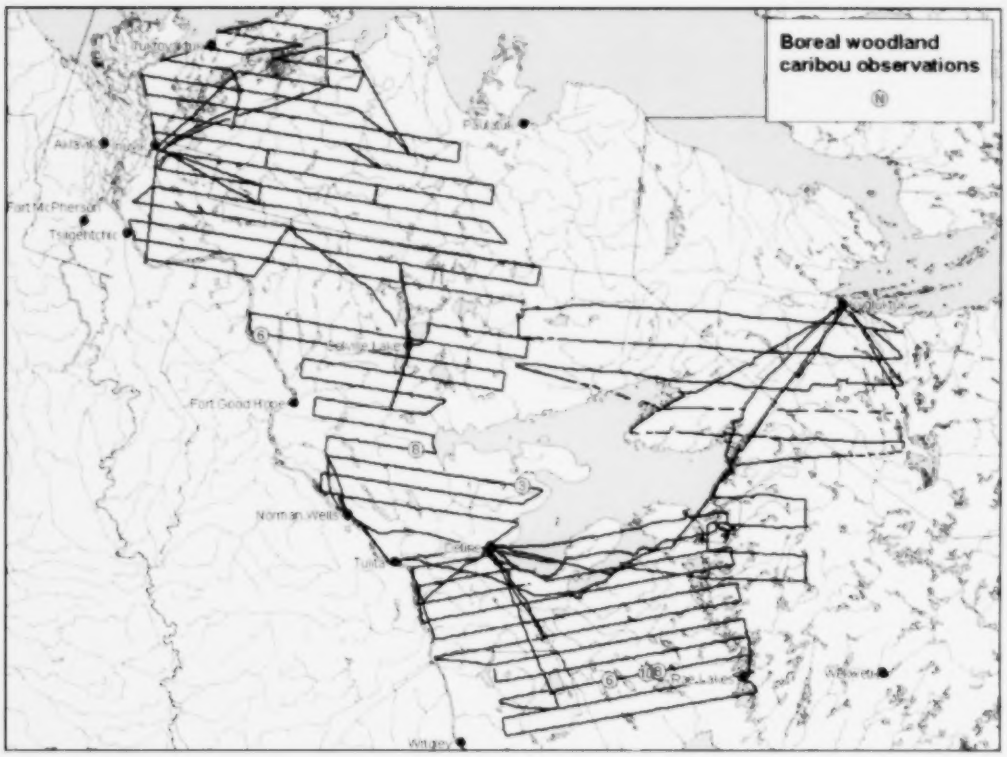

Figure 6. Boreal woodland caribou observed along transects flown February to April, 2004.

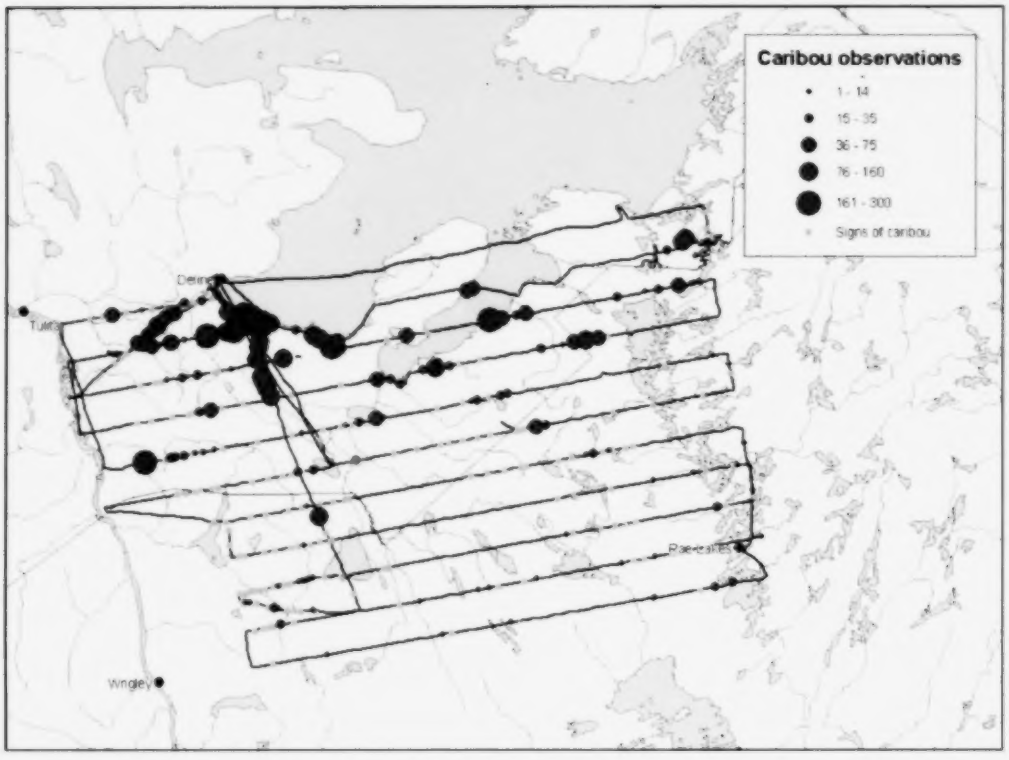

Figure 7. Caribou and signs observed along transect 28 February to 2 March, 2004 southwest of Great Bear Lake, NWT.

During the radio-tracking flight on 1 April 2004 (Figure 8), we (AV) heard an active Bluenose-West collar (ID # 347) on the south shore of Great Bear Lake (65 06 N; 121 58 W – 150.021 MHz) and a second Bluenose-West collar (ID # 353) in mortality mode near Dismal Lake, northeast Great Bear Lake (67 17 N; 117 39 W - 150.222 MHz). Conditions for this flight were generally good, except for the south side of Great Bear Lake. We were forced to fly further off over the lake by the Manitou Island area due to cloud and snow.

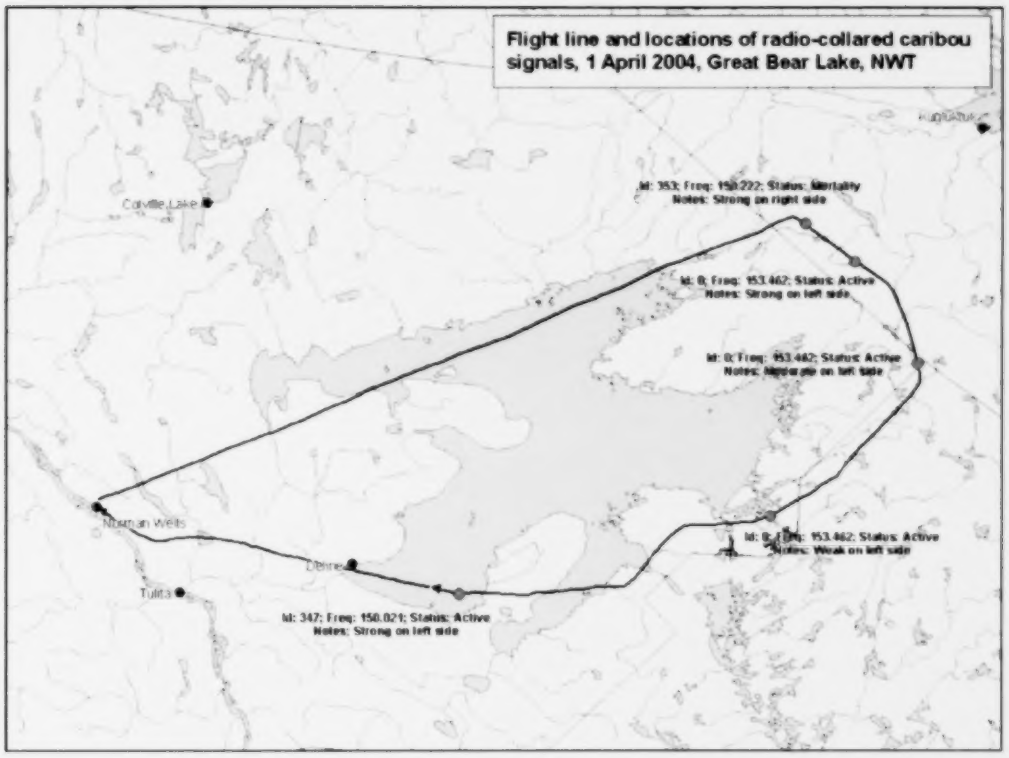
Flight line and locations of radio-collared caribou signals, 1 April 2004, Great Bear Lake, NWT
Colville Lake
Norman Wells
Tulita
Id: 347; Freq: 150.021; Status: Active
Notes: Strong on left side

Figure 8. Flight line and locations of radio-collared caribou signals, 1 April 2004, Great Bear Lake, NWT.

We completed the aerial survey based out of Norman Wells and Kugluktuk between 16 and 19 April 2004 (Figures 2 and 9), and counted 1593 barren-ground caribou. We saw few caribou above the treeline. Most caribou were migrating along the east shore of Great Bear Lake. Another migration corridor was found north of Great Bear Lake from Anderson River (Manoir Lake vicinity) towards Bluenose Lake. We radio-tracked during the survey and located caribou ID # 347 again, but east of Hornby Bay this time (66'28" 46.0 N, 116 '22" 20.1 W). We counted 306 muskoxen (11 calves included) in 13 herds (Figure 4). Other observations included 10 moose and 4 wolves.

The distance flown was 5,550 km. The weather was clear with good visibility, and temperatures remained between –10 and –20 °C.

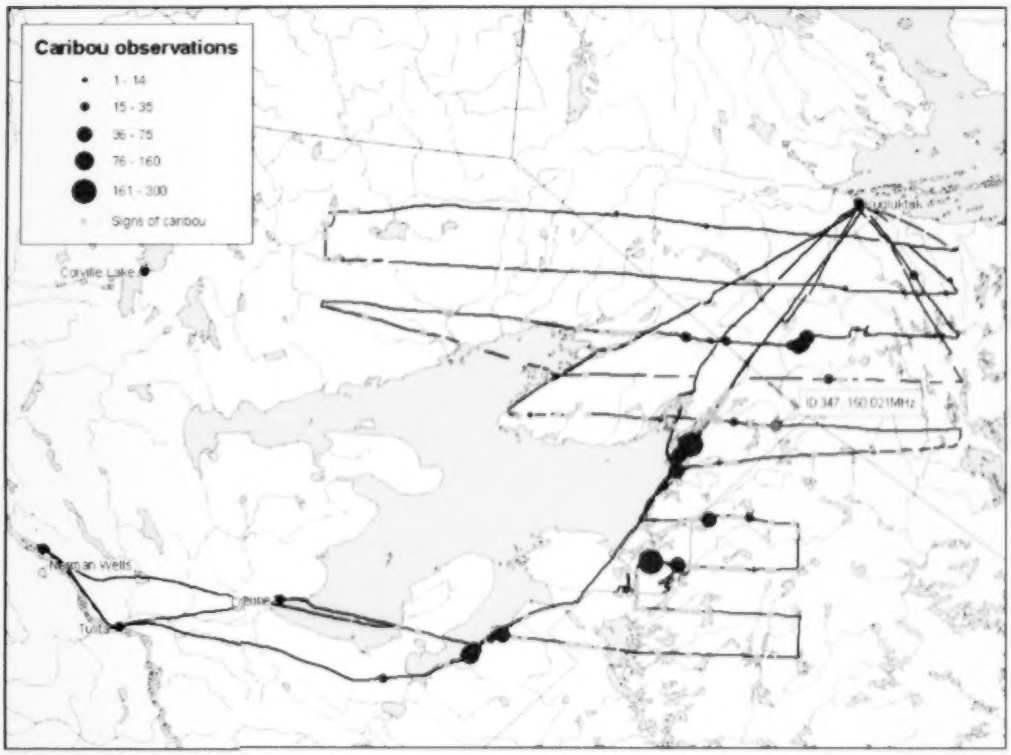

Figure 9. Barren-ground caribou and their signs observed along transect, 16–19 April 2004, Great Bear Lake, NWT to Kugluktuk, Nunavut.

Caribou Numbers

East of Inuvik, the survey was flown at 5% coverage. Caribou were counted within 0.5 km strip on either side of the aircraft, with transects spaced at 20-km intervals. The plane was flown at approximately 400–500 feet above ground level. We counted a total of 634 caribou on transect and an additional 387 off transect. For caribou seen on transect, our survey would account for a little over 12,000 animals. At such low coverage, this estimate has low reliability.

For the Sahtu-Nunavut survey, flying along line transects provided extensive coverage and a snapshot of caribou late winter distribution. Observers counted individual animals and estimated caribou group size of all caribou observed at any distance from the aircraft.

DISCUSSION

Small-scattered groups of barren-ground caribou were widely distributed across the Central NWT in late winter 2004. The highest concentration of caribou was located southwest of Great Bear Lake (Figure 10). Lower numbers of caribou used winter ranges on the arctic coast northeast of Tuktoyaktuk, with a band of caribou extending southeast from Inuvik to northeast of Colville Lake. The caribou distribution also extended along the east side of Great Bear Lake to east of the Coppermine River.

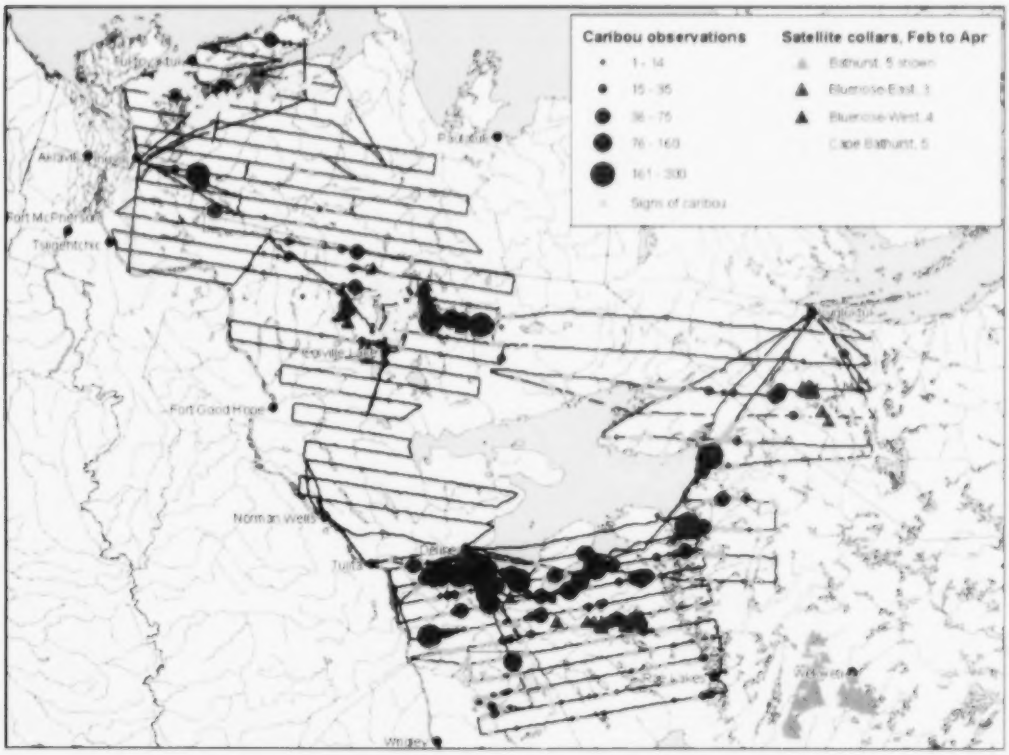

Figure 10. Caribou observations, flight lines and locations of satellite-collared caribou February, March and April 2004.

Hunters reported that there were no caribou in the area south of Paulatuk. Hunters had traveled as far south as Simpson Lake in search of caribou. We

also did not fly the upper part of the Cape Bathurst Peninsula as we had reports from hunters and pilots traveling in the area that there were no caribou there.

In the Sahtu Settlement Area, there was no reports or local knowledge of barren-ground caribou west of the Mackenzie River outside of the known barren-ground caribou range. East of the Mackenzie River, south of Bear River and Great Bear Lake, and north of Wrigley to Rae, there was evidence of intense caribou use. The southwestern extent of the distribution to the Mackenzie River and Wrigley was not determined as the transects stopped short. Possibly, caribou were not easily accessible to hunters at Wrigley as they carried out a community caribou hunt near Deline. In Fort Good Hope hunters were concerned that few caribou were wintering in areas near their community, and blamed oil and gas exploration activities. Local displacement of caribou from access routes may be due to noise and activity from traffic along winter roads. Larger numbers of caribou were usually present in the exploration areas near Fort Good Hope and Colville Lake before the Colville Lake winter road was built.

Colville Lake elders were concerned about disturbance from noise and activity from oil and gas exploration, and winter road development, upon caribou distribution. Fewer caribou were seen in 2003 compared to the past five years during the Colville Lake annual community hunt, taking place the first week of September at Horton Lake. This area is a fall migration corridor. Caribou tracks noted by Colville Lake people from helicopter flights in April indicated that caribou were very localized for a long time this winter. Deep snow may have hindered caribou movements in some locations.

Norman Wells residents report no caribou were found crossing snowmobile trails between Fort Good Hope and Norman Wells, and Norman Wells to Smith Arm of Great Bear Lake. Caribou were not found migrating around the west end of Great Bear Lake before freeze up. People from Tulita reported that caribou were plentiful along the winter road from Bennett Field to Deline from December to April. Deline reported plentiful caribou south of Great Bear Lake close to the community from December to April. Concerns were expressed about people from other communities hunting on selected Sahtu lands, and that some hunters were disrespectful to caribou by leaving gut piles on or adjacent to the winter road.

Kugluktuk hunters observed an abundance of caribou in the Dismal Lakes to Caribou Point, Great Bear Lake area when there was little snow cover during October 2003 (pers. comm. M. Dumond). This was followed by a period of mild temperatures, then the absence of large numbers of caribou throughout the winter. Snow hardness and crust layer may have affected caribou range use in this area.

We have previously described the distribution of the Bathurst herd during unsystematic flights to locate groups for estimating calf survival (Gunn *et al.* 2005). The distribution of those flights (Figure 11) was based on locations of the satellite-collared caribou, hunters' reports and locations of wolves fitted with vhf collars. The herd wintered in an area extending from northwest to southeast of Great Slave Lake.

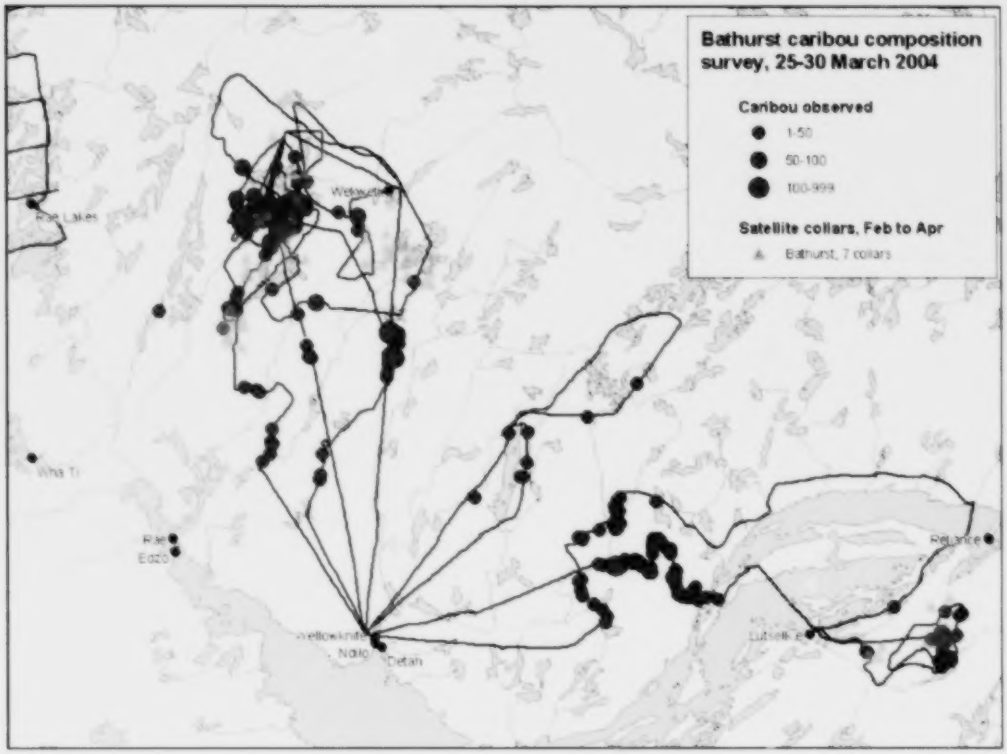

Figure 11. Caribou observations, flight lines and locations of satellite-collared caribou on the Bathurst herd's range, March 2004, NWT

Caribou distribution relative to satellite collars

The distribution of caribou in the western NWT in winter 2003/04 is consistent with two characteristics of their winter range use. The first characteristic involves caribou winter ranges varying between years. As barren-caribou winter distribution varies annually, the availability of caribou to communities using them is affected. The second characteristic of caribou wintering ranges is some overlap of winter ranges between neighboring herds.

Annual variation in the winter range

Annual variation in caribou winter range is well known, though it is only recently measurable through the use of satellite telemetry. Analyses using telemetry and weather data reveal how annual variation in the winter range partly reflects snowfall early in winter (McNeill *et al.* in prep.). Freezing rains followed by deep snow along the Arctic coast from Cape Bathurst to Paulatuk during fall 2003 may have caused caribou of the Bluenose-West and Cape Bathurst herds to winter south of their normal wintering ranges. The Inuvik area experienced the deepest late winter snow conditions observed by people in the area (Nagy *et al* . in prep, Nagy *et al.* 2004).

An indication of the scale of variation in the winter ranges can be estimated from telemetry data. For example, Gunn *et al.* (2001) estimated that satellite-collared cows in the Bathurst herd used winter ranges that were variable in overlap between successive winter ranges. On average the overlap was 31 ± 17.7% SE and varied from no overlap (1996/97 and 1997/98) to 75% (1998/99 and 1999/00).

Likewise, the winter distribution of the Cape Bathurst, Bluenose-West and Bluenose-East herds varies between years. In the 1960s to 1980s, the areas used north of Great Bear Lake varied between surveys, with some areas used more frequently (Carruthers and Jakimchuk, 1981). The area north of the Hare Indian River and west of the Horton River, and the Caribou Point areas, were two frequently used forested areas. On the tundra the Rae-Richardson River area and Dismal Lakes were two frequently used areas.

More recently, based on satellite collared caribou cows, we have determined that the Cape Bathurst herd typically winters in the area of Tuktoyaktuk Peninsula and Husky Lakes. However, in winter 2003-2004, two satellite collared Cape Bathurst cows wintered near Colville Lake (Nagy *et al.*, in prep).

Caribou of the Bluenose-West herd normally winter in the area from the southern Tuktoyaktuk Peninsula and Husky Lakes area to Paulatuk and south to Great Bear Lake. However, in winter 2003-2004, most caribou appeared to winter in the area of Great Bear Lake (Nagy *et al.*, in prep).

Winter Range Overlap

The second characteristic of barren-ground caribou winter range use is that overlap between herds is common. Heard (1984) originally described overlapping winter range for the Beverly and Qamanirjuaq herds based on hunters returning ear-tags. Overlap between neighboring herds of barren-ground caribou in the NWT is now recorded using satellite-collars on cows (Gunn, in Prep.; Nagy *et al.*, in Prep.; Gunn *et al.*, 2001; Gunn and D'Hont, 2003).

The Bluenose-East herd, over the last several years, typically winters in areas south, east and northeast of Great Bear Lake. The observed highest concentration of caribou in this area in winter 2003-2004 suggests that this herd was mostly on its normal wintering area, overlapping to some extent with caribou from other herds. The collared Bluenose-West cow ID # 347 observed in the Manitou Island area in early April indicates overlap between Bluenose-West and Bluenose-East. The Bluenose-East and the Bathurst herd ranges also overlap in

some winters (Gunn, in prep.). Based on satellite collar data, ranges did not overlap in the 2003-04 winter. Microsatellite DNA analysis has been suggested as a potential tool for determining which herd is being harvested in an area where herd distribution overlap occurs.

The satellite-collared cows allow us both to map an annual winter range for those cows, and also to confirm any overlapping winter ranges between neighboring herds. However, the distribution of the satellite-collared cows is unlikely to completely represent any one herd's total winter distribution. Firstly, only cows are fitted with satellite-collars, so the distribution of bulls is not adequately represented. It is common for bulls to winter further south than cows (Kelsall, 1968). Secondly, the number of cows fitted with satellite collars is relatively low, at between 10-20 cows.

We currently lack data to test how the distribution of satellite collared cows relates to overall winter distribution. An opportunity to compare the winter range determined from collared cows versus systematic aerial surveys will be in March 2006, when some 160 caribou from the Bluenose-East, Bluenose-West and Cape Bathurst herds will have been collared (vhf and uhf collars) in March 2005. These cows will join the 10 - 20 Bathurst herd cows already satellite collared. Systematic aerial survey and radio-tracking will allow a comparison of the two measures of winter distribution.

Satellite collars are now used to determine seasonal caribou availability to hunters (Prichard *et al.*, 2003) by comparing subsistence-use areas to the distribution of satellite-collared cows. McNeill *et al.* (in prep.) have taken this

approach a step further by including how categories of environmental variation affect distribution in their studies.

The question of the number of satellite-collared individuals required to measure caribou distribution relative to community hunting areas, for example, is currently unknown. Otto *et al.* (2003) modeled statistical power relative to sample size and suggested that 15 - 52 collared individuals were necessary to detect 50% probability of representative distribution in a herd of 350 – 525,000 caribou. Trimper and Chubbs (2003) and Boulanger *et al.* (2004) took a more empirical approach by measuring caribou densities relative to locations of satellite-collared caribou. The collared caribou were relatively representative of the caribou densities, although seasonal variation was high (Boulanger *et al.*, in prep.; Trimper and Chubbs, 2003).

ACKNOWLEDGEMENTS

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APPENDIX A.

Observations of caribou and caribou signs east of Inuvik, 24 to 28 March, 2004.

Time(MST)	linenum	waypoint	lat	long	on/off	left/right	total
24 Mar, 12:20	2	2	68.270	-132.859	out	r	10
24 Mar, 12:55	5	5	68.103	-129.966	out	l	5
25 Mar, 11:59	17	17	68.285	-131.853	out	r	70
25 Mar, 12:47	21	21	68.310	-128.566	out	r	3
25 Mar, 13:38	26	26	68.459	-129.798	in	l	10
25 Mar, 16:02	32	31	69.111	-131.898	in	l	13
26 Mar, 12:15	38	2	69.277	-131.988	in	r	75
26 Mar, 12:18	39	3	69.280	-131.913	in	r	50
26 Mar, 12:20	40	4	69.287	-131.750	in	r	15
26 Mar, 13:10	42	6	69.889	-130.026	in	l	5
26 Mar, 13:10	43	6	69.889	-130.026	in	r	2
26 Mar, 13:12	44	7	69.880	-130.162	in	r	4
26 Mar, 13:15	45	8	69.870	-130.425	out	l	9
26 Mar, 13:16	46	9	69.869	-130.462	out	r	8
26 Mar, 13:18	47	10	69.864	-130.630	in	r	8
26 Mar, 13:21	48	11	69.856	-130.816	out	r	7
26 Mar, 13:21	49	12	69.856	-130.852	in	r	5
26 Mar, 13:22	50	13	69.854	-130.907	in	r	10
26 Mar, 13:24	51	14	69.850	-131.030	in	r	40
26 Mar, 13:33	52	15	69.823	-131.711	in	r	3
26 Mar, 14:01	53	16	69.614	-132.503	in	r	25
26 Mar, 14:15	54	17	69.660	-131.395	in	r	10
26 Mar, 16:09	58	21	69.184	-134.002	in	r	5
26 Mar, 16:15	59	22	69.206	-133.557	in	r	50
26 Mar, 16:19	60	23	69.225	-133.189	in	r	4
26 Mar, 16:22	62	24	69.236	-132.962	in	r	100
26 Mar, 16:22	61	24	69.236	-132.962	in	l	15
26 Mar, 16:38	63	25	69.093	-131.974	in	r	25
26 Mar, 16:52	64	26	69.043	-133.164	in	r	25
28 Mar, 17:12	86	21	68.047	-131.414	in	r	2
28 Mar, 17:17	87	22	68.052	-131.286	in	l	75
28 Mar, 18:29	89	24	68.355	-132.648	in	l	13
28 Mar, 18:29	90	24	68.355	-132.648	out	r	15
28 Mar, 18:40	91	25	68.381	-132.041	out	r	40
28 Mar, 18:42	92	26	68.371	-131.946	in	r	40
28 Mar, 18:43	94	28	68.354	-131.987	out	r	200
28 Mar, 18:43	93	27	68.352	-131.940	out	r	25

Time(MST)	lat	long	Observation
24 Mar, 13:07	68.128	-128.976	BGC tracks
24 Mar, 15:21	68.438	-127.720	BGC tracks
25 Mar, 12:46	68.309	-128.606	BGC tracks
25 Mar, 12:48	68.313	-128.491	BGC tracks
25 Mar, 12:55	68.323	-128.002	BGC tracks
25 Mar, 14:19	68.651	-129.416	BGC tracks
25 Mar, 14:25	68.661	-129.007	BGC tracks, old
26 Mar, 12:25	69.300	-131.435	BGC fresh craters
28 Mar, 16:11	67.810	-132.760	BGC tracks

APPENDIX B.

Observations of caribou and caribou signs northwest of Great Bear Lake, 24 to 28 February, 2004.

Time (GPS)	lat	long	count
24 Feb, 20:48	67.206	-126.549	4
24 Feb, 21:07	67.540	-127.564	21
24 Feb, 21:08	67.542	-127.591	5
24 Feb, 21:28	67.781	-128.916	9
24 Feb, 21:30	67.800	-129.042	10
24 Feb, 21:31	67.806	-129.110	8
24 Feb, 21:35	67.844	-129.398	1
24 Feb, 21:42	67.923	-129.763	5
24 Feb, 21:51	67.928	-129.206	15
24 Feb, 21:53	67.932	-129.076	12
24 Feb, 22:06	67.952	-128.217	9
24 Feb, 22:14	67.961	-127.763	20
24 Feb, 22:21	67.969	-127.340	48
25 Feb, 16:41	67.362	-126.282	4
25 Feb, 17:09	67.798	-127.382	30
25 Feb, 17:35	67.764	-129.120	20
25 Feb, 17:39	67.754	-129.369	10
25 Feb, 17:45	67.743	-129.770	3
25 Feb, 18:03	67.558	-129.648	6
25 Feb, 18:19	67.587	-128.628	12
25 Feb, 18:37	67.608	-127.502	13
25 Feb, 18:42	67.614	-127.197	50
25 Feb, 19:02	67.628	-125.850	45
25 Feb, 19:03	67.628	-125.841	1
25 Feb, 19:12	67.630	-125.281	2
25 Feb, 19:15	67.630	-125.084	7
25 Feb, 19:30	67.631	-124.157	10
25 Feb, 19:58	67.453	-123.250	10
25 Feb, 20:04	67.444	-123.659	70
25 Feb, 20:07	67.444	-123.796	300
25 Feb, 20:14	67.449	-124.285	100
25 Feb, 20:40	67.453	-124.433	5
25 Feb, 20:40	67.453	-124.455	2
25 Feb, 20:40	67.455	-124.480	34
25 Feb, 20:40	67.454	-124.431	75
25 Feb, 20:42	67.453	-124.572	8
25 Feb, 20:42	67.455	-124.586	7
25 Feb, 20:42	67.455	-124.591	150
25 Feb, 20:43	67.456	-124.643	30

Time (GPS)	lat	long	count
25 Feb, 20:51	67.407	-125.039	58
25 Feb, 20:52	67.411	-125.099	200
25 Feb, 20:55	67.451	-125.190	50
25 Feb, 21:08	67.452	-126.005	3
25 Feb, 21:08	67.452	-126.009	12
25 Feb, 21:30	67.439	-127.319	4
25 Feb, 21:49	67.418	-128.500	5
25 Feb, 23:13	67.251	-127.552	10
25 Feb, 23:29	67.265	-126.576	4
25 Feb, 23:34	67.267	-126.234	10
25 Feb, 23:35	67.266	-126.176	40
25 Feb, 23:50	67.199	-125.708	10
26 Feb, 17:07	67.272	-124.613	14
26 Feb, 17:36	67.142	-123.152	25
26 Feb, 18:02	67.095	-124.724	2
26 Feb, 18:27	67.090	-126.317	15
26 Feb, 18:29	67.089	-126.463	1
26 Feb, 18:32	67.088	-126.607	2
26 Feb, 18:34	67.085	-126.770	30
26 Feb, 18:51	67.073	-127.804	2
26 Feb, 20:23	66.892	-127.393	6
26 Feb, 20:44	66.911	-126.077	15
26 Feb, 21:21	66.983	-126.137	5

Date (GPS)	lat	long	Observation
24 Feb, 22:02	67.946	-128.513	Tracks - Barren Grnd
24 Feb, 22:06	67.950	-128.274	Tracks - Barren Grnd
24 Feb, 22:45	67.984	-125.881	Tracks - Barren Grnd
25 Feb, 0:20	67.806	-126.295	Tracks - Barren Grnd
25 Feb, 0:46	67.367	-126.307	Tracks - Barren Grnd
25 Feb, 23:12	67.251	-127.642	Tracks - Barren Grnd
25 Feb, 23:45	67.292	-125.698	Tracks - Barren Grnd
26 Feb, 16:48	67.269	-125.701	Barren Ground Tracks
26 Feb, 16:56	67.271	-125.260	Barren Ground Tracks
26 Feb, 18:18	67.094	-125.751	Barren Ground Tracks
26 Feb, 18:38	67.083	-126.990	Barren Ground Tracks
26 Feb, 18:42	67.081	-127.287	Barren Ground Tracks
26 Feb, 20:09	66.877	-128.236	Barren Ground Tracks
26 Feb, 20:17	66.883	-127.764	Barren Ground Tracks
26 Feb, 20:26	66.897	-127.225	Barren Ground Tracks
26 Feb, 20:32	66.902	-126.821	Barren Ground Tracks
26 Feb, 20:37	66.906	-126.523	Barren Ground Tracks
26 Feb, 23:07	66.722	-127.196	Barren Ground Tracks
26 Feb, 23:56	66.538	-127.363	Barren Ground Tracks
26 Feb, 23:59	66.541	-127.163	Barren Ground Tracks

APPENDIX C.

Observations of caribou and caribou signs southwest of Great Bear Lake, 28 February to 2 March, 2004.

Date (GPS)	lat	long	count
28 Feb, 19:31	64.996	-123.892	20
28 Feb, 19:31	64.996	-123.895	30
28 Feb, 19:31	64.995	-123.897	50
28 Feb, 19:31	64.993	-123.906	30
28 Feb, 19:31	65.002	-123.865	50
28 Feb, 19:32	64.972	-123.963	60
28 Feb, 19:33	64.961	-123.986	20
28 Feb, 19:33	64.956	-123.994	30
28 Feb, 19:33	64.966	-123.976	30
28 Feb, 19:34	64.930	-124.042	80
28 Feb, 19:34	64.931	-124.040	20
28 Feb, 19:35	64.913	-124.069	50
28 Feb, 19:35	64.916	-124.064	50
28 Feb, 19:36	64.889	-124.116	10
28 Feb, 19:36	64.886	-124.123	15
28 Feb, 19:36	64.903	-124.085	30
28 Feb, 19:37	64.882	-124.133	50
28 Feb, 19:37	64.871	-124.160	10
28 Feb, 19:39	64.838	-124.244	40
28 Feb, 20:15	64.679	-123.851	10
28 Feb, 20:16	64.680	-123.846	5
28 Feb, 20:18	64.698	-123.685	15
28 Feb, 20:21	64.721	-123.520	20
28 Feb, 20:21	64.723	-123.506	5
28 Feb, 20:27	64.773	-123.159	10
28 Feb, 20:33	64.818	-122.837	50
28 Feb, 20:43	64.852	-122.578	100
28 Feb, 20:49	64.928	-122.006	20
28 Feb, 20:49	64.933	-122.058	215
28 Feb, 20:49	64.928	-122.005	30
28 Feb, 20:50	64.930	-121.989	8
28 Feb, 20:50	64.929	-121.998	10
28 Feb, 20:50	64.932	-121.978	50
28 Feb, 20:50	64.932	-121.975	7
28 Feb, 21:03	65.026	-121.217	40
28 Feb, 21:19	65.130	-120.331	60
28 Feb, 21:19	65.131	-120.327	50
28 Feb, 21:20	65.136	-120.290	200
28 Feb, 21:21	65.140	-120.229	100
28 Feb, 21:22	65.148	-120.150	50

Date (GPS)	lat	long	count
28 Feb, 21:25	65.168	-119.996	30
28 Feb, 21:27	65.179	-119.888	50
28 Feb, 21:43	65.290	-118.850	25
28 Feb, 21:48	65.323	-118.540	10
28 Feb, 21:51	65.336	-118.395	20
28 Feb, 21:54	65.361	-118.157	50
28 Feb, 21:55	65.364	-118.114	35
28 Feb, 21:56	65.373	-118.023	10
28 Feb, 21:56	65.377	-117.986	5
28 Feb, 21:57	65.384	-117.918	10
28 Feb, 22:31	65.088	-119.047	50
28 Feb, 22:33	65.073	-119.179	70
28 Feb, 22:33	65.073	-119.187	100
28 Feb, 22:35	65.065	-119.256	2
28 Feb, 22:36	65.061	-119.313	70
28 Feb, 22:37	65.052	-119.369	14
28 Feb, 22:38	65.046	-119.436	5
28 Feb, 22:42	65.019	-119.685	20
28 Feb, 22:58	64.901	-120.696	25
28 Feb, 22:59	64.893	-120.782	5
28 Feb, 22:59	64.890	-120.811	15
28 Feb, 22:59	64.893	-120.785	10
28 Feb, 23:00	64.883	-120.862	12
28 Feb, 23:00	64.879	-120.886	5
28 Feb, 23:00	64.884	-120.856	100
28 Feb, 23:00	64.883	-120.857	50
28 Feb, 23:01	64.877	-120.904	10
28 Feb, 23:01	64.875	-120.926	20
28 Feb, 23:02	64.868	-120.991	20
28 Feb, 23:08	64.789	-121.235	18
28 Feb, 23:10	64.808	-121.352	30
28 Feb, 23:12	64.803	-121.492	10
28 Feb, 23:12	64.802	-121.497	50
28 Feb, 23:13	64.799	-121.531	25
28 Feb, 23:42	64.566	-123.317	40
28 Feb, 23:44	64.548	-123.443	20
29 Feb, 0:43	64.816	-124.176	30
29 Feb, 0:45	64.829	-124.084	30
29 Feb, 0:46	64.830	-124.068	40
29 Feb, 0:47	64.845	-123.977	10
29 Feb, 0:49	64.857	-123.873	34
29 Feb, 0:49	64.858	-123.859	40
29 Feb, 0:49	64.859	-123.857	30
29 Feb, 0:49	64.857	-123.876	50

Date (GPS)	lat	long	count
29 Feb, 0:51	64.882	-123.716	10
29 Feb, 0:55	64.913	-123.474	200
29 Feb, 0:56	64.923	-123.424	10
29 Feb, 0:56	64.913	-123.471	100
29 Feb, 0:57	64.928	-123.384	30
29 Feb, 0:57	64.929	-123.370	5
29 Feb, 0:57	64.927	-123.390	15
29 Feb, 0:58	64.937	-123.317	3
29 Feb, 0:58	64.933	-123.347	5
29 Feb, 0:59	64.946	-123.254	30
29 Feb, 0:59	64.945	-123.262	150
29 Feb, 0:59	64.944	-123.264	60
29 Feb, 1:00	64.948	-123.232	15
29 Feb, 1:00	64.950	-123.219	10
29 Feb, 1:01	64.954	-123.176	200
29 Feb, 1:01	64.954	-123.179	150
29 Feb, 1:03	64.972	-123.064	30
29 Feb, 1:04	64.983	-122.970	40
29 Feb, 1:04	64.982	-122.979	20
29 Feb, 1:05	64.991	-122.926	15
29 Feb, 1:05	64.992	-122.914	30
29 Feb, 1:05	64.994	-122.905	50
29 Feb, 1:06	65.003	-122.844	50
29 Feb, 1:06	65.001	-122.865	100
29 Feb, 1:06	64.999	-122.877	200
29 Feb, 1:06	65.001	-122.857	150
29 Feb, 1:07	65.006	-122.801	5
29 Feb, 1:07	65.008	-122.782	40
29 Feb, 1:07	65.009	-122.775	20
29 Feb, 1:07	65.005	-122.817	50
29 Feb, 1:07	65.004	-122.823	30
29 Feb, 1:07	65.005	-122.803	50
29 Feb, 1:07	65.004	-122.827	100
29 Feb, 1:08	65.011	-122.760	50
29 Feb, 1:08	65.013	-122.744	10
29 Feb, 1:08	65.015	-122.731	5
29 Feb, 1:10	65.027	-122.790	30
29 Feb, 1:11	65.030	-122.835	10
29 Feb, 1:11	65.032	-122.859	50
29 Feb, 1:11	65.030	-122.833	15
29 Feb, 1:11	65.029	-122.831	30
29 Feb, 1:13	65.045	-122.958	50
29 Feb, 1:13	65.037	-122.891	25
29 Feb, 1:14	65.045	-122.985	130

Date (GPS)	lat	long	count
29 Feb, 1:15	65.053	-123.121	50
29 Feb, 1:15	65.051	-123.095	50
29 Feb, 1:15	65.052	-123.099	130
29 Feb, 1:15	65.052	-123.115	40
29 Feb, 17:48	65.568	-117.780	9
29 Feb, 17:48	65.571	-117.840	5
29 Feb, 17:49	65.572	-117.853	25
29 Feb, 18:01	65.586	-118.116	100
29 Feb, 18:02	65.572	-118.141	100
29 Feb, 18:03	65.558	-118.133	5
29 Feb, 18:06	65.527	-118.297	10
29 Feb, 18:06	65.525	-118.318	20
29 Feb, 18:06	65.524	-118.328	1
29 Feb, 18:45	65.279	-120.515	50
29 Feb, 18:46	65.270	-120.578	50
29 Feb, 18:46	65.274	-120.598	10
29 Feb, 19:13	64.962	-121.998	50
29 Feb, 19:14	64.959	-122.020	50
29 Feb, 19:16	64.963	-122.190	100
29 Feb, 19:16	64.965	-122.217	150
29 Feb, 19:17	64.977	-122.265	160
29 Feb, 19:19	64.981	-122.306	50
29 Feb, 19:21	64.994	-122.477	34
29 Feb, 19:26	65.018	-122.773	50
29 Feb, 20:58	65.080	-123.592	25
29 Feb, 21:02	65.057	-123.774	20
29 Feb, 21:03	65.051	-123.806	7
29 Feb, 21:10	64.994	-124.253	10
29 Feb, 21:15	64.948	-124.577	50
29 Feb, 22:05	64.264	-123.992	100
29 Feb, 22:06	64.269	-123.960	25
29 Feb, 22:06	64.269	-123.958	300
29 Feb, 22:10	64.309	-123.683	20
29 Feb, 22:10	64.311	-123.669	15
29 Feb, 22:10	64.306	-123.700	10
29 Feb, 22:11	64.318	-123.631	20
29 Feb, 22:11	64.320	-123.619	5
29 Feb, 22:11	64.317	-123.639	10
29 Feb, 22:12	64.327	-123.556	6
29 Feb, 22:13	64.328	-123.544	30
29 Feb, 22:14	64.350	-123.421	5
29 Feb, 22:16	64.357	-123.345	10
29 Feb, 22:16	64.359	-123.332	4
29 Feb, 22:18	64.378	-123.220	6

Date (GPS)	lat	long	count
29 Feb, 22:34	64.508	-122.270	4
29 Feb, 22:42	64.567	-121.799	6
29 Feb, 22:44	64.590	-121.651	30
29 Feb, 22:44	64.587	-121.668	7
29 Feb, 22:47	64.615	-121.466	40
29 Feb, 22:49	64.622	-121.383	12
29 Feb, 23:05	64.739	-120.424	3
29 Feb, 23:06	64.747	-120.359	20
29 Feb, 23:10	64.778	-120.098	30
29 Feb, 23:11	64.790	-120.019	20
29 Feb, 23:47	65.034	-117.734	12
29 Feb, 23:52	64.995	-117.547	6
01 Mar, 0:34	64.657	-119.564	17
01 Mar, 0:35	64.653	-119.593	6
01 Mar, 0:36	64.644	-119.669	70
01 Mar, 0:37	64.638	-119.732	12
01 Mar, 1:09	64.407	-121.638	17
01 Mar, 17:21	64.339	-122.103	20
01 Mar, 17:21	64.339	-122.099	10
01 Mar, 17:25	64.318	-122.267	20
01 Mar, 18:41	64.161	-122.131	3
01 Mar, 19:27	64.525	-119.089	1
01 Mar, 19:29	64.532	-119.018	20
01 Mar, 19:31	64.551	-118.845	12
01 Mar, 19:59	64.620	-117.342	10
01 Mar, 21:12	63.948	-117.411	20
01 Mar, 21:16	63.926	-117.589	20
01 Mar, 21:28	63.860	-118.241	6
01 Mar, 21:29	63.858	-118.260	5
01 Mar, 21:58	63.696	-119.786	10
01 Mar, 22:12	63.613	-120.516	10
01 Mar, 22:35	63.463	-121.728	2
01 Mar, 23:03	63.581	-122.263	20
01 Mar, 23:41	64.115	-121.981	100
02 Mar, 0:12	64.662	-122.670	100
02 Mar, 0:14	64.699	-122.727	100
02 Mar, 0:15	64.719	-122.753	100
02 Mar, 0:16	64.728	-122.766	100
02 Mar, 0:17	64.753	-122.799	100
02 Mar, 0:21	64.834	-122.879	100
02 Mar, 0:23	64.893	-122.873	100
02 Mar, 0:24	64.919	-122.868	100
02 Mar, 0:27	64.973	-122.890	100
02 Mar, 0:28	64.986	-122.977	100

Date (GPS)	lat	long	count
02 Mar, 0:29	64.989	-123.017	100
02 Mar, 0:29	64.987	-122.984	100
02 Mar, 0:31	65.009	-123.096	100
02 Mar, 0:31	65.002	-123.081	100
02 Mar, 0:31	65.015	-123.112	100
02 Mar, 0:32	65.024	-123.166	100
02 Mar, 0:34	65.042	-123.271	100
02 Mar, 17:28	63.975	-122.114	10
02 Mar, 18:28	64.422	-118.326	6
02 Mar, 18:34	64.466	-117.893	10
02 Mar, 18:42	64.512	-117.401	4
02 Mar, 18:49	64.396	-117.220	4
02 Mar, 18:58	64.310	-117.610	16
02 Mar, 19:30	64.138	-119.251	6
02 Mar, 20:44	63.817	-121.995	7
02 Mar, 20:44	63.821	-121.971	6
02 Mar, 20:45	63.809	-122.039	2
02 Mar, 20:45	63.812	-122.020	5
02 Mar, 20:46	63.806	-122.056	2
02 Mar, 20:46	63.804	-122.073	2
02 Mar, 20:47	63.798	-122.120	4
02 Mar, 20:51	63.763	-122.336	10
02 Mar, 21:01	63.669	-122.668	12
02 Mar, 21:02	63.670	-122.627	10
02 Mar, 21:06	63.655	-122.348	25
02 Mar, 21:06	63.653	-122.305	10
02 Mar, 21:06	63.655	-122.352	20
02 Mar, 21:12	63.667	-121.928	3
02 Mar, 21:31	63.762	-120.788	3
02 Mar, 21:41	63.843	-120.160	6
02 Mar, 21:42	63.856	-120.048	2
02 Mar, 21:50	63.916	-119.541	2
02 Mar, 22:04	64.018	-118.629	10
02 Mar, 22:09	64.056	-118.268	6
02 Mar, 22:27	64.173	-117.111	1

Date (GPS)	lat	long	observation
28 Feb, 19:24	65.116	-123.560	Barren Ground Tracks
28 Feb, 19:41	64.816	-124.270	Barren Ground Tracks
28 Feb, 19:43	64.757	-124.400	Barren Ground Tracks
28 Feb, 19:43	64.778	-124.349	Barren Ground Tracks
28 Feb, 19:45	64.724	-124.464	Barren Ground Tracks
28 Feb, 20:11	64.637	-124.139	Barren Ground Tracks
28 Feb, 20:14	64.657	-123.972	Barren Ground Tracks
28 Feb, 20:15	64.668	-123.915	Barren Ground Tracks
28 Feb, 20:24	64.748	-123.347	Barren Ground Tracks
28 Feb, 20:25	64.759	-123.277	Barren Ground Tracks
28 Feb, 21:00	64.998	-121.435	Barren Ground Tracks
28 Feb, 21:08	65.053	-120.980	Barren Ground Tracks
28 Feb, 21:23	65.155	-120.106	Barren Ground Tracks
28 Feb, 22:29	65.099	-118.942	Barren Ground Tracks
28 Feb, 22:53	64.944	-120.359	Barren Ground Tracks
28 Feb, 22:56	64.916	-120.601	Barren Ground Tracks
28 Feb, 23:08	64.789	-121.247	Barren Ground Tracks
28 Feb, 23:19	64.756	-121.895	Barren Ground Tracks
28 Feb, 23:28	64.682	-122.454	Barren Ground Tracks
28 Feb, 23:32	64.648	-122.711	Barren Ground Tracks
28 Feb, 23:36	64.614	-122.964	Barren Ground Tracks
28 Feb, 23:40	64.583	-123.200	Barren Ground Tracks
28 Feb, 23:42	64.564	-123.325	Barren Ground Tracks
28 Feb, 23:44	64.552	-123.405	Barren Ground Tracks
28 Feb, 23:46	64.538	-123.511	Barren Ground Tracks
28 Feb, 23:47	64.532	-123.549	Barren Ground Tracks
28 Feb, 23:49	64.508	-123.729	Barren Ground Tracks
28 Feb, 23:53	64.474	-123.955	Barren Ground Tracks
28 Feb, 23:56	64.454	-124.111	Barren Ground Tracks
29 Feb, 0:41	64.808	-124.227	Barren Ground Tracks
29 Feb, 0:45	64.824	-124.114	Barren Ground Tracks
29 Feb, 0:48	64.854	-123.902	Barren Ground Tracks
29 Feb, 0:51	64.882	-123.718	Barren Ground Tracks
29 Feb, 0:55	64.904	-123.544	Barren Ground Tracks
29 Feb, 17:37	65.719	-117.900	Barren Ground Tracks
29 Feb, 17:40	65.642	-117.871	Barren Ground Tracks
29 Feb, 17:41	65.612	-117.809	Barren Ground Tracks
29 Feb, 18:00	65.609	-118.122	Barren Ground Tracks
29 Feb, 19:18	64.975	-122.285	Barren Ground Tracks
29 Feb, 20:57	65.097	-123.477	Barren Ground Tracks
29 Feb, 20:59	65.068	-123.657	Barren Ground Tracks
29 Feb, 21:00	65.064	-123.689	Barren Ground Tracks

Date (GPS)	lat	long	observation
29 Feb, 21:05	65.029	-123.980	Barren Ground Tracks
29 Feb, 21:07	65.007	-124.133	Barren Ground Tracks
29 Feb, 21:12	64.973	-124.414	Barren Ground Tracks
29 Feb, 21:13	64.961	-124.497	Barren Ground Tracks
29 Feb, 21:16	64.936	-124.674	Barren Ground Tracks
29 Feb, 21:18	64.917	-124.808	Barren Ground Tracks
29 Feb, 22:07	64.284	-123.877	Barren Ground Tracks
29 Feb, 22:09	64.300	-123.740	Barren Ground Tracks
29 Feb, 22:14	64.348	-123.455	Barren Ground Tracks
29 Feb, 22:16	64.356	-123.354	Barren Ground Tracks
29 Feb, 22:19	64.391	-123.123	Barren Ground Tracks
29 Feb, 22:26	64.442	-122.759	Barren Ground Tracks
29 Feb, 22:32	64.492	-122.373	Barren Ground Tracks
29 Feb, 22:37	64.537	-122.046	Barren Ground Tracks
29 Feb, 22:41	64.563	-121.845	Barren Ground Tracks
29 Feb, 22:43	64.576	-121.725	Barren Ground Tracks
29 Feb, 22:59	64.692	-120.799	Barren Ground Tracks
29 Feb, 23:03	64.730	-120.519	Barren Ground Tracks
29 Feb, 23:08	64.767	-120.232	Barren Ground Tracks
29 Feb, 23:39	64.980	-118.271	Barren Ground Tracks
29 Feb, 23:54	64.953	-117.520	Barren Ground Tracks
01 Mar, 0:02	64.844	-117.826	Barren Ground Tracks
01 Mar, 0:12	64.785	-118.370	Barren Ground Tracks
01 Mar, 0:12	64.815	-118.375	Barren Ground Tracks
01 Mar, 0:22	64.739	-118.819	Barren Ground Tracks
01 Mar, 0:38	64.627	-119.812	Barren Ground Tracks
01 Mar, 0:39	64.621	-119.857	Barren Ground Tracks
01 Mar, 0:40	64.618	-119.894	Barren Ground Tracks
01 Mar, 0:44	64.587	-120.172	Barren Ground Tracks
01 Mar, 0:46	64.571	-120.314	Barren Ground Tracks
01 Mar, 0:49	64.551	-120.475	Barren Ground Tracks
01 Mar, 0:51	64.534	-120.619	Barren Ground Tracks
01 Mar, 0:53	64.522	-120.712	Barren Ground Tracks
01 Mar, 0:57	64.490	-120.973	Barren Ground Tracks
01 Mar, 1:02	64.459	-121.228	Barren Ground Tracks
01 Mar, 17:12	64.483	-122.064	Barren Ground Tracks
01 Mar, 17:25	64.317	-122.272	Barren Ground Tracks
01 Mar, 17:26	64.307	-122.339	Barren Ground Tracks
01 Mar, 17:28	64.294	-122.429	Barren Ground Tracks
01 Mar, 17:31	64.273	-122.583	Barren Ground Tracks
01 Mar, 17:34	64.250	-122.758	Barren Ground Tracks
01 Mar, 17:41	64.202	-123.125	Barren Ground Tracks
01 Mar, 17:43	64.192	-123.196	Barren Ground Tracks
01 Mar, 17:45	64.177	-123.302	Barren Ground Tracks

Date (GPS)	lat	long	observation
01 Mar, 17:47	64.168	-123.370	Barren Ground Tracks
01 Mar, 17:48	64.154	-123.456	Barren Ground Tracks
01 Mar, 17:49	64.150	-123.484	Barren Ground Tracks
01 Mar, 17:50	64.141	-123.558	Barren Ground Tracks
01 Mar, 18:22	64.034	-123.119	Barren Ground Tracks
01 Mar, 18:24	64.042	-122.989	Barren Ground Tracks
01 Mar, 18:29	64.078	-122.725	Barren Ground Tracks
01 Mar, 18:32	64.101	-122.566	Barren Ground Tracks
01 Mar, 18:36	64.135	-122.318	Barren Ground Tracks
01 Mar, 18:38	64.153	-122.175	Barren Ground Tracks
01 Mar, 18:41	64.178	-121.989	Barren Ground Tracks
01 Mar, 18:43	64.196	-121.841	Barren Ground Tracks
01 Mar, 18:46	64.213	-121.717	Barren Ground Tracks
01 Mar, 18:46	64.219	-121.682	Barren Ground Tracks
01 Mar, 19:08	64.383	-120.352	Barren Ground Tracks
01 Mar, 19:11	64.404	-120.170	Barren Ground Tracks
01 Mar, 19:14	64.425	-119.988	Barren Ground Tracks
01 Mar, 19:17	64.452	-119.747	Barren Ground Tracks
01 Mar, 19:17	64.445	-119.795	Barren Ground Tracks
01 Mar, 19:23	64.492	-119.389	Barren Ground Tracks
01 Mar, 19:25	64.507	-119.244	Barren Ground Tracks
01 Mar, 19:30	64.544	-118.913	Barren Ground Tracks
01 Mar, 19:32	64.556	-118.806	Barren Ground Tracks
01 Mar, 19:34	64.571	-118.653	Barren Ground Tracks
01 Mar, 19:36	64.580	-118.573	Barren Ground Tracks
01 Mar, 21:19	63.909	-117.751	Barren Ground Tracks
01 Mar, 22:10	63.627	-120.411	Barren Ground Tracks
01 Mar, 22:46	63.392	-122.294	Barren Ground Tracks
01 Mar, 22:59	63.539	-122.528	Barren Ground Tracks
01 Mar, 23:00	63.554	-122.442	Barren Ground Tracks
01 Mar, 23:01	63.563	-122.382	Barren Ground Tracks
01 Mar, 23:02	63.568	-122.335	Barren Ground Tracks
01 Mar, 23:04	63.583	-122.246	Barren Ground Tracks
01 Mar, 23:06	63.599	-122.117	Barren Ground Tracks
01 Mar, 23:22	63.769	-121.504	Barren Ground Tracks
01 Mar, 23:35	64.005	-121.827	Barren Ground Tracks
01 Mar, 23:38	64.045	-121.891	Barren Ground Tracks
02 Mar, 17:12	64.002	-122.949	Barren Ground Tracks
02 Mar, 17:14	63.930	-122.913	Barren Ground Tracks
02 Mar, 17:17	63.884	-122.801	Barren Ground Tracks
02 Mar, 17:18	63.891	-122.740	Barren Ground Tracks
02 Mar, 17:22	63.918	-122.526	Barren Ground Tracks
02 Mar, 17:23	63.936	-122.418	Barren Ground Tracks
02 Mar, 17:26	63.959	-122.238	Barren Ground Tracks

Date (GPS)	lat	long	observation
02 Mar, 17:27	63.967	-122.167	Barren Ground Tracks
02 Mar, 17:29	63.982	-122.045	Barren Ground Tracks
02 Mar, 17:31	63.999	-121.937	Barren Ground Tracks
02 Mar, 17:33	64.013	-121.806	Barren Ground Tracks
02 Mar, 18:11	64.308	-119.376	Barren Ground Tracks
02 Mar, 18:14	64.331	-119.198	Barren Ground Tracks
02 Mar, 18:20	64.371	-118.793	Barren Ground Tracks
02 Mar, 18:36	64.479	-117.754	Barren Ground Tracks
02 Mar, 18:41	64.505	-117.446	Barren Ground Tracks
02 Mar, 18:50	64.366	-117.214	Barren Ground Tracks
02 Mar, 18:56	64.319	-117.517	Barren Ground Tracks
02 Mar, 18:57	64.312	-117.592	Barren Ground Tracks
02 Mar, 19:15	64.220	-118.496	Barren Ground Tracks
02 Mar, 19:19	64.196	-118.723	Barren Ground Tracks
02 Mar, 19:22	64.177	-118.879	Barren Ground Tracks
02 Mar, 19:28	64.147	-119.178	Barren Ground Tracks
02 Mar, 20:06	63.912	-121.156	Barren Ground Tracks
02 Mar, 20:07	63.903	-121.209	Barren Ground Tracks
02 Mar, 20:07	63.907	-121.184	Barren Ground Tracks
02 Mar, 20:07	63.905	-121.196	Barren Ground Tracks
02 Mar, 20:15	63.835	-121.646	Barren Ground Tracks
02 Mar, 20:42	63.834	-121.847	Barren Ground Tracks
02 Mar, 20:48	63.783	-122.204	Barren Ground Tracks
02 Mar, 20:49	63.777	-122.250	Barren Ground Tracks
02 Mar, 20:50	63.768	-122.311	Barren Ground Tracks
02 Mar, 20:52	63.761	-122.393	Barren Ground Tracks
02 Mar, 20:54	63.744	-122.470	Barren Ground Tracks
02 Mar, 20:55	63.734	-122.528	Barren Ground Tracks
02 Mar, 20:56	63.724	-122.622	Barren Ground Tracks
02 Mar, 20:56	63.726	-122.581	Barren Ground Tracks
02 Mar, 20:57	63.714	-122.664	Barren Ground Tracks
02 Mar, 20:58	63.709	-122.691	Barren Ground Tracks
02 Mar, 20:59	63.703	-122.745	Barren Ground Tracks
02 Mar, 21:01	63.669	-122.702	Barren Ground Tracks
02 Mar, 21:02	63.670	-122.619	Barren Ground Tracks
02 Mar, 21:03	63.669	-122.540	Barren Ground Tracks
02 Mar, 21:05	63.660	-122.412	Barren Ground Tracks
02 Mar, 21:08	63.655	-122.211	Barren Ground Tracks
02 Mar, 21:09	63.657	-122.135	Barren Ground Tracks
02 Mar, 21:10	63.659	-122.064	Barren Ground Tracks
02 Mar, 21:13	63.667	-121.911	Barren Ground Tracks
02 Mar, 21:27	63.738	-121.006	Barren Ground Tracks
02 Mar, 21:45	63.868	-119.942	Barren Ground Tracks
02 Mar, 21:49	63.901	-119.667	Barren Ground Tracks

Date (GPS)	lat	long	observation
02 Mar, 22:06	64.032	-118.488	Barren Ground Tracks
02 Mar, 22:07	64.045	-118.374	Barren Ground Tracks
02 Mar, 22:12	64.077	-118.068	Barren Ground Tracks
02 Mar, 22:13	64.080	-118.027	Barren Ground Tracks
02 Mar, 22:14	64.085	-117.973	Barren Ground Tracks

APPENDIX D.

Observations of caribou and caribou signs Great Bear Lake to Kugluktuk, 16 to 19 April, 2004.

Date (GPS)	lat	long	count
16 Apr, 15:42	64.804	-121.807	18
16 Apr, 15:56	64.994	-120.620	100
16 Apr, 15:58	65.027	-120.576	50
16 Apr, 16:51	66.191	-117.829	50
16 Apr, 16:54	66.256	-117.937	10
16 Apr, 21:03	67.709	-118.955	2
16 Apr, 21:18	67.668	-117.531	2
17 Apr, 0:22	67.312	-115.351	10
17 Apr, 0:40	67.280	-113.780	11
17 Apr, 0:48	67.361	-113.715	1
17 Apr, 15:04	67.391	-114.287	18
17 Apr, 15:05	66.974	-115.996	64
17 Apr, 15:05	66.962	-116.053	72
17 Apr, 15:05	67.015	-115.934	58
17 Apr, 15:19	67.021	-113.851	1
17 Apr, 15:20	67.023	-113.967	1
17 Apr, 15:34	67.036	-115.017	3
17 Apr, 15:39	67.067	-115.158	4
17 Apr, 15:52	66.979	-115.989	32
17 Apr, 15:53	66.960	-116.065	40
17 Apr, 15:53	66.962	-116.091	26
17 Apr, 15:55	66.965	-116.178	24
17 Apr, 16:00	66.978	-117.372	6
17 Apr, 16:06	66.980	-117.151	16
17 Apr, 16:09	66.979	-117.416	4
17 Apr, 16:13	66.995	-117.755	17
17 Apr, 16:13	66.997	-117.781	24
17 Apr, 18:45	66.764	-115.589	35
17 Apr, 23:50	66.469	-120.042	12
18 Apr, 0:26	66.497	-116.999	22
18 Apr, 1:51	66.244	-117.197	2
18 Apr, 2:09	66.284	-117.790	40
18 Apr, 2:10	66.293	-117.776	24
18 Apr, 20:44	66.415	-117.511	1
18 Apr, 20:46	66.346	-117.630	300
18 Apr, 20:53	66.280	-117.762	20
18 Apr, 21:20	65.900	-117.399	10
18 Apr, 21:21	65.903	-117.315	45
18 Apr, 21:30	65.919	-116.733	30
18 Apr, 21:56	65.608	-116.647	1
18 Apr, 22:10	65.617	-117.743	55
18 Apr, 22:11	65.603	-117.775	20
18 Apr, 22:20	65.630	-118.138	250
19 Apr, 0:07	65.132	-120.188	42

19 Apr, 0:09 65.102 -120.352 20

Date (GPS)	lat	long	observation
16 Apr, 15:52	64.928	-120.930	cratering
16 Apr, 16:01	65.100	-120.420	BG caribou tracks
16 Apr, 16:05	65.176	-120.196	BG caribou tracks, cratering
16 Apr, 16:10	65.258	-119.879	BG caribou tracks, cratering
16 Apr, 16:50	66.142	-117.857	BG caribou tracks
16 Apr, 17:00	66.459	-117.899	BG caribou tracks, cratering
16 Apr, 17:04	66.598	-117.822	BG caribou tracks, cratering
16 Apr, 17:06	66.625	-117.891	BG caribou tracks, cratering
16 Apr, 21:34	67.707	-118.937	BG caribou tracks, cratering
16 Apr, 21:56	67.688	-120.718	BG caribou tracks
16 Apr, 22:02	67.589	-123.035	BG caribou tracks
16 Apr, 22:03	67.486	-123.522	BG caribou tracks
16 Apr, 22:04	67.278	-123.273	BG caribou tracks
16 Apr, 22:04	67.397	-123.454	BG caribou tracks
16 Apr, 22:23	67.572	-123.090	BG caribou tracks
16 Apr, 22:32	67.553	-123.361	BG caribou tracks
16 Apr, 22:35	67.465	-123.465	BG caribou tracks
16 Apr, 22:40	67.419	-123.459	BG caribou tracks
16 Apr, 22:44	67.277	-123.409	BG caribou tracks
16 Apr, 22:46	67.277	-123.269	BG caribou tracks
16 Apr, 22:48	67.294	-123.191	cratering
17 Apr, 16:03	67.003	-119.398	BG caribou tracks
17 Apr, 16:04	67.032	-120.213	BG caribou tracks
17 Apr, 16:05	67.036	-121.465	BG caribou tracks
17 Apr, 16:19	67.012	-118.272	BG caribou tracks
17 Apr, 16:22	67.007	-118.538	BG caribou tracks
17 Apr, 16:23	67.006	-118.615	BG caribou tracks
17 Apr, 16:24	67.003	-118.732	cratering
17 Apr, 16:26	67.000	-118.842	BG caribou tracks, cratering
17 Apr, 16:26	67.000	-118.900	BG caribou tracks
17 Apr, 16:28	67.002	-119.051	BG caribou tracks
17 Apr, 16:32	67.003	-119.405	BG caribou tracks
17 Apr, 16:42	67.033	-120.220	BG caribou tracks
17 Apr, 16:55	67.036	-121.366	BG caribou tracks
17 Apr, 16:55	67.036	-121.424	BG caribou tracks
17 Apr, 17:26	66.957	-122.681	BG caribou tracks
17 Apr, 17:36	66.900	-121.771	BG caribou tracks
17 Apr, 18:00	66.734	-119.266	BG caribou tracks
17 Apr, 18:04	66.765	-115.415	BG caribou tracks
17 Apr, 18:04	66.766	-115.393	BG caribou tracks
17 Apr, 18:44	66.764	-115.628	BG caribou tracks
17 Apr, 18:46	66.766	-115.415	BG caribou tracks

Date (GPS)	lat	long	observation
17 Apr, 19:10	66.888	-113.766	BG caribou tracks
17 Apr, 19:11	66.900	-113.784	BG caribou tracks
17 Apr, 23:02	66.895	-119.174	BG caribou tracks
17 Apr, 23:05	66.483	-119.638	BG caribou tracks
17 Apr, 23:16	66.950	-118.612	BG caribou tracks
17 Apr, 23:21	66.903	-118.932	BG caribou tracks
17 Apr, 23:26	66.895	-119.152	BG caribou tracks
17 Apr, 23:48	66.457	-120.221	BG caribou tracks
17 Apr, 23:56	66.485	-119.499	BG caribou tracks
17 Apr, 23:57	66.489	-119.438	BG caribou tracks
18 Apr, 0:00	66.500	-119.193	BG caribou tracks
18 Apr, 0:00	66.398	-117.603	BG caribou tracks
18 Apr, 0:00	66.454	-117.502	BG caribou tracks
18 Apr, 0:09	66.493	-118.328	BG caribou tracks
18 Apr, 0:14	66.532	-118.031	BG caribou tracks, cratering
18 Apr, 0:21	66.506	-117.480	BG caribou tracks
18 Apr, 0:23	66.501	-117.269	BG caribou tracks
18 Apr, 0:24	66.502	-117.205	BG caribou tracks, cratering
18 Apr, 0:24	66.500	-117.255	BG caribou tracks
18 Apr, 0:27	66.497	-116.989	BG caribou tracks
18 Apr, 0:30	66.485	-116.754	BG caribou tracks
18 Apr, 0:32	66.482	-116.572	BG caribou tracks
18 Apr, 1:18	66.332	-114.526	BG caribou tracks
18 Apr, 1:34	66.308	-115.793	BG caribou tracks
18 Apr, 1:48	66.255	-116.981	BG caribou tracks
18 Apr, 1:49	66.250	-117.074	BG caribou tracks
18 Apr, 1:52	66.235	-117.323	cratering
18 Apr, 1:53	66.231	-117.392	BG caribou tracks
18 Apr, 2:06	66.193	-117.875	BG caribou tracks
18 Apr, 2:07	66.208	-117.858	BG caribou tracks
18 Apr, 2:12	66.369	-117.651	BG caribou tracks
18 Apr, 2:17	66.509	-117.423	BG caribou tracks
18 Apr, 2:17	66.483	-117.463	BG caribou tracks
18 Apr, 2:19	66.545	-117.356	BG caribou tracks
18 Apr, 2:20	66.564	-117.318	BG caribou tracks
18 Apr, 2:22	66.637	-117.184	BG caribou tracks
18 Apr, 2:22	66.617	-117.219	BG caribou tracks
18 Apr, 2:41	67.088	-116.248	BG caribou tracks
18 Apr, 20:33	66.679	-117.108	BG caribou tracks, cratering
18 Apr, 20:34	66.661	-117.133	BG caribou tracks
18 Apr, 20:35	66.635	-117.169	BG caribou tracks
18 Apr, 20:37	66.607	-117.209	cratering
18 Apr, 20:38	66.564	-117.275	BG caribou tracks
18 Apr, 20:40	66.513	-117.352	BG caribou tracks

Date (GPS)	lat	long	observation
18 Apr, 20:40	66.531	-117.322	BG caribou tracks, cratering
18 Apr, 21:16	65.895	-117.718	BG caribou tracks
18 Apr, 21:17	65.899	-117.596	BG caribou tracks, cratering
18 Apr, 21:19	65.901	-117.510	BG caribou tracks
18 Apr, 21:25	65.928	-117.113	BG caribou tracks, cratering
18 Apr, 21:27	65.930	-116.954	BG caribou tracks, cratering
18 Apr, 21:29	65.925	-116.852	BG caribou tracks, cratering
18 Apr, 21:34	65.898	-116.401	BG caribou tracks
18 Apr, 21:38	65.896	-116.065	BG caribou tracks
18 Apr, 21:40	65.850	-116.006	BG caribou tracks
18 Apr, 21:52	65.611	-116.384	BG caribou tracks
18 Apr, 21:53	65.610	-116.429	cratering
18 Apr, 21:58	65.613	-116.839	BG caribou tracks
18 Apr, 21:59	65.614	-116.886	BG caribou tracks
18 Apr, 22:00	65.615	-116.939	BG caribou tracks
18 Apr, 22:01	65.614	-117.019	BG caribou tracks, cratering
18 Apr, 22:03	65.613	-117.184	BG caribou tracks, cratering
18 Apr, 22:03	65.614	-117.235	BG caribou tracks, cratering
18 Apr, 22:04	65.615	-117.280	BG caribou tracks, cratering
18 Apr, 22:06	65.614	-117.469	cratering
18 Apr, 22:07	65.615	-117.559	BG caribou tracks, cratering
18 Apr, 22:08	65.616	-117.605	BG caribou tracks, cratering
18 Apr, 22:09	65.618	-117.687	BG caribou tracks, cratering
18 Apr, 22:17	65.632	-118.018	BG caribou tracks
18 Apr, 22:18	65.626	-118.090	BG caribou tracks, cratering
18 Apr, 22:24	65.564	-118.335	BG caribou tracks
18 Apr, 22:26	65.518	-118.328	BG caribou tracks, cratering
18 Apr, 22:27	65.493	-118.327	BG caribou tracks, cratering
18 Apr, 22:27	65.476	-118.324	BG caribou tracks, cratering
18 Apr, 22:29	65.434	-118.315	BG caribou tracks, cratering
18 Apr, 22:30	65.388	-118.316	BG caribou tracks, cratering
18 Apr, 22:31	65.348	-118.319	BG caribou tracks, cratering
18 Apr, 22:33	65.349	-118.213	BG caribou tracks, cratering
18 Apr, 22:37	65.350	-117.907	BG caribou tracks
18 Apr, 22:39	65.348	-117.704	BG caribou tracks
18 Apr, 22:41	65.347	-117.602	BG caribou tracks
18 Apr, 22:42	65.347	-117.495	BG caribou tracks, cratering
18 Apr, 22:43	65.347	-117.425	BG caribou tracks, cratering
18 Apr, 22:45	65.348	-117.273	BG caribou tracks
18 Apr, 22:59	65.341	-116.385	BG caribou tracks
18 Apr, 23:20	65.086	-116.563	BG caribou tracks, cratering
18 Apr, 23:33	65.085	-117.529	BG caribou tracks
18 Apr, 23:39	65.081	-117.964	BG caribou tracks, cratering
18 Apr, 23:50	65.100	-118.843	cratering

Date (GPS)	lat	long	observation
18 Apr, 23:52	65.103	-118.965	BG caribou tracks
18 Apr, 23:53	65.105	-119.051	cratering
18 Apr, 23:54	65.108	-119.163	BG caribou tracks
18 Apr, 23:55	65.111	-119.242	BG caribou tracks, cratering
19 Apr, 0:03	65.124	-119.870	BG caribou tracks
19 Apr, 0:05	65.128	-120.006	BG caribou tracks, cratering
19 Apr, 0:23	65.109	-121.389	BG caribou tracks, cratering
19 Apr, 0:26	65.124	-121.673	BG caribou tracks
19 Apr, 1:13	65.180	-123.561	BG caribou tracks
19 Apr, 1:14	65.172	-123.614	BG caribou tracks
19 Apr, 1:18	65.128	-123.946	BG caribou tracks, cratering
19 Apr, 1:31	64.981	-125.122	BG caribou tracks

APPENDIX E.

Observations of boreal woodland caribou from late winter survey February to April, 2004.

DATE (GPS)	LAT	LON	COUNT
26 Feb, 19:42	66.825	-129.806	6
27 Feb, 18:39	66.021	-125.521	8
27 Feb, 23:18	65.823	-122.847	3
02 Mar, 19:30	64.134	-119.279	8
02 Mar, 19:35	64.105	-119.541	10
02 Mar, 19:51	64.010	-120.342	6

APPENDIX F.

Observations of muskoxen from late winter survey February to April, 2004.

DATE (GPS)	LAT	LON	COUNT
25 Feb, 19:49	67.616	-123.110	53
26 Feb, 17:00	67.272	-125.050	2
26 Feb, 17:01	67.271	-125.018	3
26 Feb, 18:03	67.095	-124.749	20
27 Feb, 18:43	66.019	-125.705	3
27 Feb, 19:04	66.009	-126.920	5
27 Feb, 19:06	66.025	-126.959	50
27 Feb, 21:57	65.569	-127.189	1
28 Feb, 0:13	65.653	-125.186	40
24 Mar, 23:30	68.707	-125.740	10
25 Mar, 0:05	68.709	-127.890	12
25 Mar, 20:18	68.494	-128.361	12
25 Mar, 20:18	68.492	-128.389	1
25 Mar, 21:49	68.711	-127.900	15
16 Apr, 20:37	67.568	-114.262	12
17 Apr, 0:48	67.346	-113.698	24
17 Apr, 0:49	67.359	-113.764	12
17 Apr, 1:02	67.586	-114.379	11
17 Apr, 15:04	67.023	-115.344	9
17 Apr, 15:08	67.237	-114.012	3
17 Apr, 15:31	67.043	-114.856	78
17 Apr, 15:34	67.036	-115.017	21
17 Apr, 15:40	67.071	-115.247	56
17 Apr, 15:41	67.061	-115.253	34
17 Apr, 15:42	67.048	-115.283	12
17 Apr, 22:41	67.490	-116.444	30
18 Apr, 0:59	66.459	-114.104	4